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Physicians' acceptance of electronic medical records exchange: An extension of the decomposed TPB model with institutional trust and perceived risk

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ABSTRACT

Purpose: Electronic medical records (EMRs) exchange improves clinical quality and reduces medical costs. However, few studies address the antecedent factors of physicians' intentions to use EMR exchange. Based on institutional trust and perceived risk integrated with the decomposed theory of planned behavior (TPB) model, we propose a theoretical model to explain the intention of physicians to use an EMR exchange system.

Methods: We conducted a field survey in Taiwan to collect data from physicians who had experience using the EMR exchange systems. A valid sample of 191 responses was collected for data analysis. To test the proposed research model, we employed structural equation modeling using the partial least squares method.

Results: The study findings show that the following five factors have a significant influence on the physicians' intentions to use EMR exchange systems: (a) attitude; (b) subjective norm; (c) perceived behavior control; (d) institutional trust; and (e) perceived risk. These five factors are predictable by perceived usefulness, perceived ease of use, and compatibility, interpersonal and governmental influence, facilitating conditions and self-efficacy, situational normality and structural assurance, and institutional trust, respectively. The results also indicate that institutional trust and perceived risk integrated with the decomposed TPB model improve the prediction of physician's intentions to use EMR exchange.

Conclusion: The results of this study indicate that our research model effectively predicts the intention of physicians to use EMR exchange, and provides valuable implications for academics and practitioners.

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1. Introduction

Since 1995, the Bureau of National Health Insurance (BNHI)¹ has been providing comprehensive health-care coverage for the majority of the 23 million people living in Taiwan. Therefore, the majority of patients tend to visit several hospitals through out their lives, and “hospital shopping” has become a relatively common occurrence in Taiwan. In fact, hospitals in Taiwan could have avoided considerable medical resource wastage if they had exchanged patient information [1]. BNHI integrated circuit (IC) card is issued by BNHI for all residents in Taiwan. It includes an embedded miniature IC chip with various medical certificates. Residents can not only conveniently receive medical services but also inquire health insurance situation and other medical-related records. The Physician IC card is issued by the Healthcare Certification Authority (HCA) for each certificated physician a physician IC card. Only physicians can access and retrieve the patient’s medical information with the physician IC card. Therefore, the Department of Health (DOH) was tasked with establishing an electronic medical record (EMR) exchange platform, where by hospital and medical staff used certification-authority IC cards with public key encryption. Physicians can search for patient anamneses by using the BNHI IC card, the physician IC card, and electronic medical certificates on the Internet. EMR exchange has played a crucial and central role in health care by providing patient information that supports numerous health care applications, such as the diagnosis, treatment, and prevention of disease. For these information-technologies (IT)-enabled benefits to manifest in Taiwan, physicians must first adopt EMR exchange systems. EMR exchange adoption is an instance of information system (IS) acceptance and use in a setting that combines IS adoption with health care elements and thus requires distinct theorization within IS literature. Despite an emerging interest in the field of medical informatics, few factors in hospitals’ adoption and implementation of EMR exchange have been identified [2–5], and only a limited and fragmented understanding of physician behavior exists on EMR contextual exchange.

Physician EMR-exchange behavior has certain differences compared to typical user behavior, including the following factors:

- (1) The EMR exchange provides a lifesaving mechanism for health care, which is a type of service.
- (2) EMR exchange must occur among competing hospitals. Therefore, EMR exchange is not a simple activity, but a socioeconomic interactive process between health care organizations and the environment in which they operate [2].
- (3) The concerns of physicians about the adequate functioning of an IS application (e.g., the protection of patient privacy) are likely to inhibit the diffusion of information, such as in EMR exchange. To build physician trust, EMR exchange providers must do more than merely providing electronic linkages.

- (4) Physicians’ resistance to the implementation of an IS has been attributed to concerns regarding its effective integration into daily workflow, a lack of time and confidentiality, and the need for high investment in technologies that are compatible with older systems [6,7].

These differences identify risks and the uncertainty of an online environment. The significant importance of trust should be emphasized in the EMR exchange. Existing variables of the technology acceptance models do not fully reflect the motives of users; therefore, it is necessary to identify additional intrinsic motivational factors. Previous research indicated that the need for incorporating additional factors improved the predictive ability and explanatory power of the behavioral intention [8,9]. A literature review reveals that further research is necessary to clarify the role of trust and risk perceptions in physicians’ acceptance of IS [7,10,11].

Based on social psychology theory and healthcare literature, we have developed an extended version of the decomposed theory of planned behavior (TPB) to predict the behavior of physicians. We achieve this by examining the major constructs of the decomposed TPB, institutional trust, perceived risk, and their most critical antecedents. Our study objectives are as listed as follows: (a) to investigate whether institutional trust and perceived risk significantly affect behavioral intention (BI) of physicians’ use of an EMR exchange system; (b) to investigate whether the effect of institutional trust on BI is not only direct, but is also achievable, by reducing perceived risk; (c) to clarify which factor has significantly influences on decisions to use EMR exchange; and (d) to evaluate whether the extension of the decomposed TPB can provide a better explanatory power to predict the adoption of EMR exchange.

2. Literature review

A survey by Shapiro et al. [12] indicated that 97% of physicians believed that health information exchanges improve healthcare safety and quality. The application of ISs among physicians has been a critical research topic in the field of medical informatics. Previous studies have investigated the factors influencing IS acceptance by physicians’ use of several information technologies, such as the Medline system [13], bedside computer technology [14], and EMR [2,7,15,16]. Compared with previous studies, we specifically highlight the factors driving physicians’ intention to use an EMR exchange system.

2.1. EMR exchange

EMR exchange systems electronically transfers patient-level clinical, demographic, and health-related information between disparate hospitals. These exchanges offer various opportunities to achieve the following six improvements to patient care: (a) safety; (b) effectiveness; (c) patient centeredness; (d) timeliness; (e) efficiency; (f) and equity [7]. Without a mechanism to exchange EMR among hospitals, the inability of hospital staff to review the medical history of patients who have visited other hospitals could also result in redundant

¹ A table of abbreviations is available in the Appendix.

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